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ABSTRACT

The observable effects of curricular tracking were investigated for a cohort of students in six Vermont high schools during the years 1981-89. The outcome variable was persistence in school as predicted by grades in academic subjects from grade 4 through 9, or time of withdrawal, and the level of courses in which students were enrolled. Three groups were identified: (1) general track; (2) vocational track; and (3) college-bound track. Data were collected from student records for 421 students. Sixty percent of the general track students dropped out; an average of 3 to 15% of the vocational and college-bound groups dropped out. Many of these students could have been identified as at-risk; by knowing how students performed in mathematics and English from grades 4 through 9, the model was able to predict the students that would drop out, and it was right 88% of the time. Results strongly suggest that curricular tracking was related to dropping out of school. Twelve bar graphs and three tables contain study data. A 51-item list of references is included. (SLD)

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CURRICULAR TRACKING IN SIX VERMONT HIGH SCHOOLS IN 1989: A LONGITUDINAL DISCRIMINANT ANALYSIS

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H. W. Meyers, Ph.D.
March 18, 1991

CURRICULAR TRACKING
IN SIX VERMONT HIGH SCHOOLS
FOR THE CLASS OF 1989:
A LONGITUDINAL DISCRIMINANT ANALYSIS

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ABSTRACT

Recently, curricular tracking practices have become a focus for questions concerning equity. John Goodlad and Jeannie Oakes in a February, 1988 article in Educational Leadership, titled "We Must Offer Equal Access to Knowledge" have outlined the issues clearly. School structures tend to prevent their capitalizing on diverse student learning styles, the assumptions upon which tracking is based are questionable, and the question of whether or not to track involves the examination of levels of access to educational programs made available to the children of the poor. (Goodlad and Oakes, 1988)

It is suspected but not known to what extent Vermont high schools track students in general, vocational and college bound curriculums. From the 1987 Vermont Statewide Pilot Assessment it was learned that Vermont eighth graders are very aware of the tracking system that they will experience later in high school. They could project for themselves which track they would enter the following year. (Brewer and Meyers, 1989)

The problem for this study was not to determine the effects of tracking students in general on their achievement and future prospects. These effects are known (Goodlad and Oakes, 1988; Slavin, 1988; Peterson, 1989; Apple, 1978), and they are nearly all harmful to children and society. Known effects include: (Oakes, 1988)

* children in the lower tracks experience the least effective teaching methods and techniques,
* children in the lower tracks spend less time engaged in high success learning activities,
* the quality of knowledge offered to lower track children is less than that offered to higher track students,
* early failure tends to become a self-fulfilling prophecy for students who are grouped in the low track.

Purpose. The purpose of this study was to determine the observable effects of tracking on a selected cohort of students in 8 Vermont high schools during the years 1981-1989. The outcome variable was persistence as predicted by grades in academic subjects from grade 4 through graduation or withdrawal and the level of courses in which students were enrolled. Graduate students from UVM visited 8 high schools and with the cooperation of guidance counselors and teachers identified three groups of students at random from the Class of 1989, when the students were in the ninth grade. The three groups were: general track, vocational track and college bound track. Data from student records were collected which included reading, (or English) mathematics and science grades from grades 4 through 12, the levels of mathematics and English from grades 9 through 12 and the date at which students dropped out or graduated.

Findings. Six high schools had sufficient data for analysis, 421 students constituted the final sample. It was not surprising that more general track students than vocational or college bound students dropped out. What was surprising was that the average proportions of drop-outs among the three groups varied so greatly. An average of three to fifteen percent of the vocational and college bound groups dropped out, while sixty percent of the general track students left school. In some schools nearly all of the general track students were gone by the 11th grade.

Could those who eventually dropped out have been identified earlier? It would seem that many of them could have been identified. Their highest risk factor was that they were in the general track (or in the lowest level of mathematics) during the ninth grade. The second and third most important risk factors were grades in mathematics and English at grade 9. Students who dropped out in grades 10 and 11 were failing English and mathematics in the ninth grade. Next in the order of predictors were grades in mathematics in grade 5 and science in grades 4. Here, students who eventually dropped out were performing about one letter grade (C-) below persisters. Grades in reading obtained at grades 4 through 8 as well as math were also significant predictors. Overall, by knowing how students performed in all of these subjects during the grades 4 through 9, the model was able to predict those student who would drop our and be right 88 percent of the time.

Discussion. If we had any doubt that the practice of tracking was at least related to failure among students who were most at risk of failure in selected Vermont high schools, it now seems clear that tracking is related to dropping out. Each of the school systems studied had leveled their instruction in reading and mathematics from least able to most able from at least grade 4 through grade 12. In every case, while general track students persisted in the lowest of the levels in grades 9 and 10, their grades continued to decline and their risk of dropping out increased. It is probable, though we do not have this data, that those student who were in the general track were also those students in the low level reading and mathematics groups from grades 1 through 9. Clearly, again, remediation of this type appears not to have had much effect on the likelihood that these students would eventually fail.

What might schools have done to change this picture? Slavin (1990) cites a growing interest in cooperative learning methods, flexible (constantly changing) within class ability grouping and the Joplin Plan in reading (although the latter has had mixed results at the middle levels). Effective Schools Research emphasizes making teachers more aware of high risk students by continually focusing their efforts on the outcome measures of students who are most at risk. Since the "failure profiles" of students within schools are probably as varied as those between schools it makes sense to place considerable effort in bringing powerful instruction models from the research on teacher effectiveness to bear through staff development. While there are probably no "quick fixes" to these problems, each year that goes by will see as many as sixty percent of general tracked students fail and leave school. Time, for them, (and us) is running out.

THE PROBLEM

Between 1987 and 1997, the enrollment of students who are under 25 years of age in higher education is expected to fall by 600,000. While the enrollment of adult students may rise during this period by as many as 217,000, the net loss of potential in the workforce during the first quarter of the 21st Century is substantial (National Center for Education Statistics, 1988). Add to these demographics the fact that the children of the poor, the black, Hispanic and rural poor, will increase in proportion to white, middle class children (Goodlad and Oakes, 1988). Finally, add to the demographics the facts that the children of the poor are more likely to be tracked into the lower academic tracks where they receive the worst instruction (Goodlad, 1984), and are least likely to be prepared for the demands of technology in the workforce. The problem which emerges from this mixture is one which threatens Vermont's (as well as the nation's) economic and security interests. Bright, capable and motivated poor children will be shunted towards non-existent or unproductive labor while the growth of society slowly grinds to a halt.

Definitions.

Track: For the purpose of this study track is defined as Curricular Track, having three values; Vocational, General and College Bound. Researchers were instructed to interview school guidance and administrative personnel and, with their help, to attempt to designate each student in the class of 1989 at each of grades 9, 10, 11 and 12, as belonging to only one of the three categories at each grade level.

Level: For the purpose of this study, level (academic level) is defined as the level of difficulty designated by the school faculty for each section of either English or mathematics. In coding course sections for level, the following conventions were followed: If the school had three levels of a course the course was designated as either, Low, Mid or High level. If the school had five levels of a course, the lowest level was designated as Low, levels 2,3 and 4 were designated as Mid; and level 5 or the highest level was designated as high.

Drop-out: For the purpose of this study, drop-out was operationally defined as any student in the cohort who left the cohort, and did not voluntarily return to school. Students who transferred to other schools, in good standing, were not classified as drop-outs. Also excluded from the sample definition were deaths. Students not fitting the above definition were labeled "persisters."

RESEARCH ON STRATIFICATION IN SECONDARY SCHOOLS

The term "stratification" in the context of grouping and tracking appears in a 1974 article by B. Heyns, "Social Selection and Stratification Within Schools." It seems the most inclusive term for the focus of research which is variously identified as research on tracking, curricular tracking, grouping, ability grouping, and "streaming" (a British term). Since 1984, at least six reviews of the literature have been conducted which focus upon the body of work described by these terms. Some reviews focus upon the elementary grades (Slavin, 1987) or upon effects concerning certain student groups (Lake, 1987). Others, (Raze, 1984; Slavin, 1990;Spencer and Allen, 1989; and Gamoran and Berends, 1987) are more directed towards secondary education in a broader context.

Defined broadly, stratification is a wide spread practice in American schools. Raze (1984), citing Johnston and Markle (1983) indicates that over seventy-seven percent of all school districts in the United States practice tracking. Teachers and administrators support the practice not only in maintaining it, but also in opinion surveys conducted from time to time (Froman, 1981). The practice seems to entail one of those interesting professional dilemmas which occurs when the research literature finds little if any redeeming value in a practice which persists in spite of what is known about generally harmful effects. Why the practice persists is beyond the scope of this paper.

This review, in further setting the context for the Vermont study, presents an overview of the current literature related to the practices of tracking and levelling, and the observed relationship of these practices to each other and to the schooling outcomes of achievement, attendance and post school activity.

Defining Tracking and Levelling

Most of the current American data sets (9 out of 10) defined track by asking students to identify their curricular program from among choices identified as academic or college preparatory, general, or a variety of vocational programs (Gamoran and Berends, 1987). One study, the National Longitudinal Study, asked both principals (and staff) and students to identify track. The correlation between the two measures for each student was .60 (Rosenbaum, 1980). So, there is some disagreement between students and staff with respect to what constitutes a track assignment. Kerckhoff (1986) asked staff to identify students by level of instruction (high, middle or low) in reading and mathematics. He maintained that he had achieved a more reliable indicator of level than the American data, though he made no direct comparisons with any other method. Hotchkiss and Dorsten (1987), working with the High School and Beyond data set, constructed a curriculum index which made it possible to assign a scaled score reflecting the extent to which each student was enrolled in academic coursework. As Gamoran and Berends (1987) note, both of the latter studies observed strong effects of their classifications on achievement.

CURRICULAR TRACKING

As noted earlier, Oakes (1985) and Goodlad (1984) investigated the incidence of academic, general and vocational tracks. Oakes, notes that there were other types of stratifications based upon course taking, when certain courses are taken and resulting in "levels" within tracks. Delaney and Garet (1986) find evidence of tracking based upon what level of algebra students are allowed to enroll for at grade 9. These and other forms of stratification distributed across schools create an inconsistency in the self-reported definitions common in the majority of American studies which makes the interpretation of results difficult (Gamoran and Berends, 1987).

The strongest appearing definitions are those based upon enrollments in courses. Another way of stating this is that most of the variance in achievement associated with tracking is explained by differential course taking, particularly in mathematics and science (Gamoran, 1987). Coursework also accounts for as much as one-third of the variance in college plans when tracking effects are investigated (Alexander and Cook, 1982).

Assumptions of the Practice

Jeannie Oakes (1986) in Part 1 of Keeping Track, identifies three major assumptions held by teachers and administrators which seem to justify the practice:

1. Teachers and administrators generally assume that tracking promotes overall student achievement,

2. Less capable students will suffer emotional and educational damage if they are forced to compete with their "brighter peers,"

3. Teaching is easier with tracking and it is perhaps the only effective way to manage student differences.

Tracking may survive in school because it is embedded in other structures. As Michael Apple (in Weis, et. al., 1989) has noted, schools reflect the "historic dominance of structures of class, race and gender stratification of American society." To the extent that school stratification reflects these structures (Oakes, 1985; Ball, 1981; Hargreaves, 1967; Ogbu, 1974), the Social Darwinist perspective (Apple, 1989) rationalizes tracking as the "natural order of things.

A third source of assumptions which, in part, seem to support the practice of tracking is some of the research which finds achievement advantages for higher ability level or academic track students (Gamoran, 1987; Vanfossen, Jones, and Spade, 1987; Kerckhoff, 1986). As might be expected, gains were even greater for college track students who eventually go to college, earn higher wages, and have higher self-esteem levels. However, when prior performance, social class and gender are controlled, positive effects are nevertheless reported for this group (Alexander and others, 1976; Kelly, 1975; Schafer and Olexa, 1971).

Slavin (1990) indicates that the practice of controlling for background variables while observing gains for high tracks is cited by Braddock (1990), Jones, Erickson and Crowell, (1972), Shafer and Olexa (1971) and Vanfossen, Jones, and Spade (1987) as evidence that tracking benefits mainly upper social strata students. He cites the belief held by researchers in the sociological tradition that tracking is "a principal engine of social inequality in society and that it causes or greatly magnifies differences along lines of class and ethnicity."

Taken together with Apple's (1989) identification of the Social Darwinist perspective, gains for able, upper middle class, white or immigrant students (Ogbu, 1989) are both a self-fulfilling prophecy and the hoped for (if curious) salvation of the American economy (Apple, 1989).

The Effects of Stratification

Notwithstanding the positive achievement, college aspiration and gains in self-concept for academic track students reported above, the record of performance for other groups (low ability, general or vocational tracks) is poor (Kulik and Kulik, 1982; Alexander, Cook and McDill, 1978; Gamoran, 1987; Heyns, 1974). The differences in performance may be attributable not only to the amount of coursework taken, but also its quality (Ball, 1981; Keddie, 1971; Page, 1984; Metz, 1978; Oakes, 1985). Track linked quality of instruction is variously defined as the pace and complexity of instructional tasks (Gamoran and Berends, 1987), the allocation of teachers who vary in skill (Ball, 1981), and varying expectations for pupil achievement (Brophy and Good, 1974; Flowers, 1966).

Empirical "best evidence" synthesis (Slavin, 1989) of 29 studies by Slavin (1990) finds an (achievement) effect of "essentially zero." That is, when ability is randomized in designs which compare tracked classes where students have been randomly assigned, most of the gains heretofore observed disappear. Slavin (1990) indicates that even studies cited in support of an achievement differential (eg. Borg, 1965) provide only weak support under these conditions.

Ethnographic and field studies of tracked classrooms reveal greater amounts of time engaged in challenging, high success tasks in higher level classes. Conversely, lower level classes are slower paced, less challenging and dull. (Gamoran and Berends, 1987) Other differences with respect to the greater amount of homework expected from high tracked students and fewer discipline problems in high tracked classrooms are real enough, but Oakes (1985) questions whether they are really important differences.
She and Goodlad (1984), Powell, Farrar and Cohen, (1985) and Boyer (1983), point out that most broad based observational studies of American schools reveal a "lifeless nature of High school classrooms," where instruction is "emotionally flat" (Goodlad, 1984). In these instances, the differences between and among classrooms when sorted by tracks are not considered great enough to warrant a causal interpretation of differences in achievement.

Other effects which may be associated with the practice of tracking include the establishment of social boundaries within the culture of the school, where students from one track have limited contact with students from another track. (Ogbu, 1974; Schwartz, 1981). The creation of subcultures, a process at least aided by the tracking practice, also carries with it the establishment of differential attitudes which are at least linked to tracks (Lacey, 1970; Ball, 1981). Hargreaves (1967) and Schwartz (1981) argue that tracking supports a process of "polarization" of student attitudes which manifests negative attitudes towards school for low tracked students, while higher tracked students tend to be at least benign if not generally positive. Schwartz (1981) observed that the process of establishing labels for students based on attitude and motivation was begun in elementary school.

Reviewing literature of between-track differences, Gamoran and Berends (1987) observe that few survey studies utilize student records in order to define the track and fewer still take the longitudinal view of student history while studying students who are most "at risk" of failure and withdrawal. The present study attempts to focus on these needed areas of research.

METHODS AND PROCEDURES

Specific objectives of the study included the following:

* Survey 10 Vermont High School principals to determine the level and kind of data collection possible for variables indicated below.
  Inclusion of students in the study depended upon agreement of the superintendent and high school principal as well as the availability of the data in student records.
* Choose a stratified random sample of the class of 1989, at each school, when said class was at grade 9. Stratification to be as follows: (projections were approximates)
  College bound: n=20; 10 males; 10 females
  General: n=30; 15 males; 15 females
  Vocational: n=24; 12 males; 12 females
* Collect data on students academic histories from grade 9, backward in time to grade 4, and forward in time to grade 12 or withdrawl from school. Variables to include: Grades in reading, mathematics, and science; levels of difficulty of English and mathematics courses from grade 9; and, date of withdrawl (if any).
* Conduct an analysis of the data according to the following hypothesis (Borg, 1987).

> No statistically significant predictive relationship between groups formed by dropping-out or persistence with respect to tracking and grades in selected courses.

RESULTS

The results section of the report is divided into two parts, description of the data and analysis of the data related to hypotheses. In the first part, as data are described, limitations which emerged from the data collection process are detailed.

Limitations:

1. Two schools were unable to identify dropouts from the cohort. These schools were dropped from further analysis. The resultant sample was therefore, 421 students in 6 high schools.

2. Some schools, two of the remaining six, said that they could not identify students by curricular track until grade 11. Track identifications at grades 9 and 10 were often the product of a judgement made by the researchers after talking with the counselor and reviewing the student's plan of study. The most efficient method of establishing track became the identification of each student's mathematics level of instruction at grade 9.

3. Letter grades were transformed from A+=99 to F=60; S=78, S-=75. About 1/3 of the grades were thus transformed. Distributions of resulting grades appeared to be reasonably normal at all grades for all courses.

4. In order to investigate the extent of relationships between and among the characteristics of students within and between tracks and ensure sufficient cell size for analysis the three tracks were stratified by track and gender within schools. (Borg, 1984) This type of sampling precludes investigation of the levels of incidence of tracking across the population of schools.

Research questions:

In order to focus the descriptive portion of the study on both independent and dependent variables a series of descriptive research questions were developed:

1. What were the distributions of students within each of the six high schools? Do the distributions conform to the proposed sampling plan?

A. Chart 1 indicates the distributions of students among schools. Most schools yielded samples of 70 to 76 students. School number 4 yielded only 55 students, but the latter were proportionately distributed among curricular tracks and mathematics levels.

2. What was the distribution of students across the six high schools with respect to gender? Does the distribution conform to the proposed sampling plan?

A. Chart 2 indicates the relative distribution of males and females in the sample. Males are slightly under-represented in the sample but the differential is not significant. School representations matched the overall pattern. The samples, both total and school, match the overall sampling plan.

3. What are the distributions of students in curricular tracks and mathematics levels at grade 9?

A. Charts 3 and 4 indicate the relative distributions in tracks and Mathematics. Combining these variables, in Chart 5, shows that ninety-nine percent of the low level mathematics students are general students at grade 9. The mid level of mathematics is composed of all three curricular tracks, but the largest proportions are both vocational and general (42 percent each). The high level of mathematics at grade 9 is composed exclusively of college bound students.

4. What is the incidence of drop-out across the sample schools?

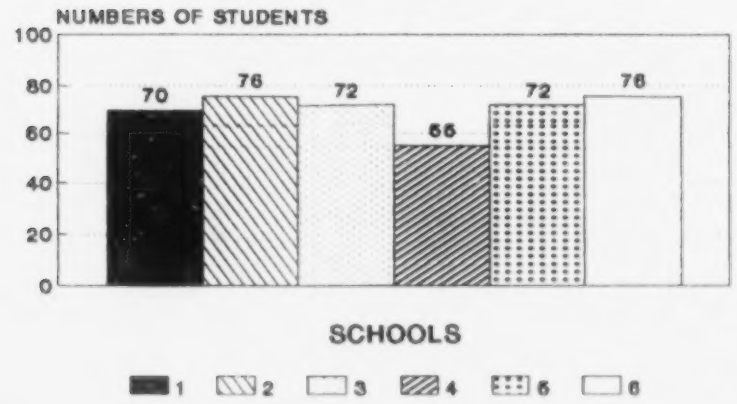
A. The rate of dropping out of school (as defined earlier) across the years of the cohort ranges from a low of 8 percent to a high of 28 percent among the high schools in the sample. (See Chart 6) Since the average rate of dropping out is 14.7 percent, school 5 was inspected for abnormal distributions of tracks and levels. School 5 actually had fewer (proportionally) low mathematics level students than was the norm for the rest of the sample, but it had a greater proportion of General students than was expected. It is likely that this over-representation of general students accounts for the somewhat higher than expected drop-out rate.

5. What are the patterns of performance among students with respect to grades in reading, English and mathematics?

A. As Charts 7 and 8 indicate, there is some downward trend to grade averages as the cohort moves through the grades, making the transition between grades 6 and 7. (All schools were 7-12 high schools.) This is somewhat surprising when one considers that by grades 10, 11 and 12, students who are most at risk and the poorest performers are gone from the cohort.

In sum, as the study began the basic questions centered on defining the samples of students as detailed in the study plan. The major question was, could a representative sample of student records be found in enough schools to verify the existence of curricular tracks and to study the interaction of student characteristics, school program and student outcomes?

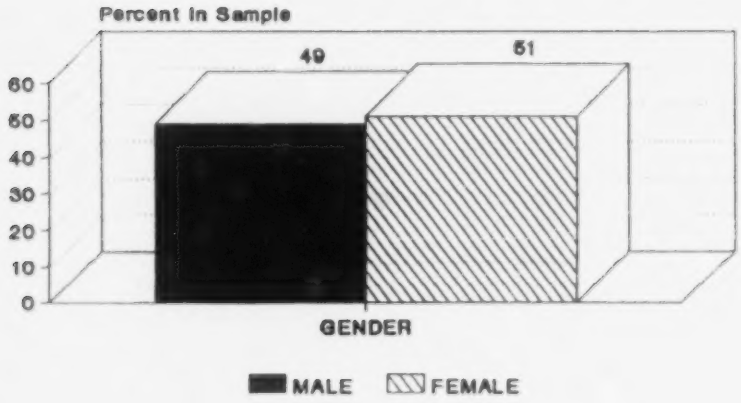
STUDENTS IN THE SAMPLE
BY SIX SCHOOLS



N=421

C-1

GENDER AND SAMPLE
At Grade 9



N=408

C-2

The answer to the major questions appears to be a qualified "yes." In fact, researchers could locate students who were identified by school personnel as belonging to the Vocational, General or College Bound track. School records revealed the existence of levels of instruction within grades which were generally ordered according to level of difficulty. Students in curricular tracks were also members of academic level tracks. Some limitations have been imposed upon the study by the lack of adequate records available in some of the high schools.

Relationships among variables: Persistence and predictors.

The next series of questions focuses upon the relationships observed between the independent variables of curricular track, academic level in mathematics at grade 9 and grade level with the outcomes of dropping-out, and academic performance.

1. When (at what grade) do schools begin to designate students as being identified in a particular level or track? Is there both informal and formal tracking?

A. Interviews with guidance personnel, principals and teachers at the selected schools suggested that students were designated into levels of instruction for reading as early as grade 1. Mathematics instruction was typically homogeneously grouped in the feeder elementary schools at grade 1 as well. Schools varied a great deal with respect to how rigid the grouping practices were. Some elementary schools regroup students on as frequently as a monthly basis, while most re-evaluate students for grouping on a yearly testing schedule. Academic "leveling", is the practice of placing students in courses according to some criteria of prior performance in the subject or related subject, matched with the planned level of difficulty of the course. Being placed in a "level" is apparently a common experience for most Vermont students from the early elementary grades through high school, and it is formalized through the scheduling of students and courses.

Curricular tracking, the practice of designating students as general, vocational or college bound is a less formal process. Most guidance counselors and principals hesitated to formally identify individual students as belonging to one track. Some schools (2) indicated that they could not identify the track before grade 11. This, they indicated, was due to the fact that students from college bound curricula in grade 11, might have taken vocational courses at grades 9 or 10. By grade 11, however, all agreed that the curricular tracks were reasonably clear, if not formally indicated on a transcript or other school record. Many school professionals indicated that a good indication of whether students were college bound or general was the level of mathematics they took at grade 9.

So, there appeared to be a strong relationship between academic levelling and curricular tracking. It will be recalled that Chart 5, indicates the relative relationship between level and track. General students tend to be placed in the low academic levels, while college students are placed in the high level. Mid level courses are a mixture of general and vocational, with fewer college bound students.

3. What is the nature of the relationship between curricular track and dropping-out?

A. Among all of the study findings, the relationship between track and dropping out is the perhaps the most dramatic. General students have more than five times the rate of dropping-out than vocational students and more than twenty times the rate of college-bound students. Sixty-three percent of the general cohort dropped out of the sample. Chart 9 indicates this result, which was statistically significant at: Chi-Square 43.19, 2df, $p < .0001$.

In addition, further investigation of the relationship between track and dropping out, over time, revealed that general students in the sample tended to drop out during grades 10 and 11, rather than at grade 9, as might have been expected. Chart 10 indicates the proportion of the drop-outs in the sample broken down by grade and track.

2. What is the nature of the relationship between academic level in mathematics and the rate at which students drop out?

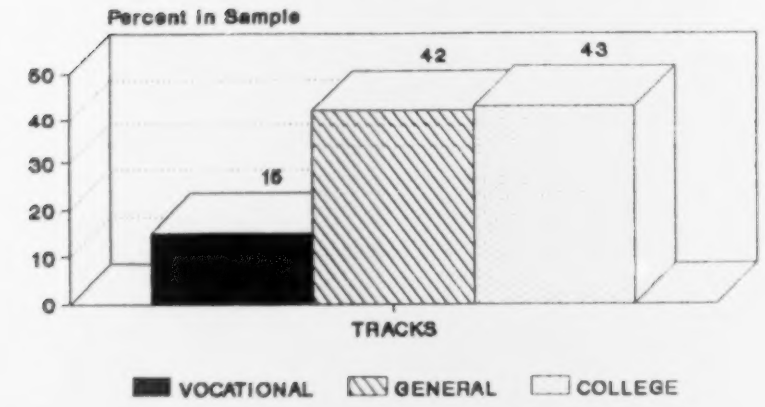
A. Results here are quite striking. Sixty-two percent of students who dropped out by the time they were seniors, were in the low level mathematics courses. Only thirty-one percent of the drop-outs were mid level and only seven percent of the drop-outs were high math level students. See Chart 11.

Looking at the group of drop-outs reveals that there was a steady increase in the proportion of low level students who dropped out between grades 9 and 11. By grade 12, most were already gone.

6. What is the nature of the relationships between academic level and reading or English and mathematics achievement?

A. As Chart 12 indicates, students who are grouped by mathematics level at grade nine tend to have significantly lower reading or English grades as they move through the grades. It is probable that reading and mathematics achievement are not independent, but as previous research indicates, reading skills are often required in mathematics courses. The gap between low level students and high level students appears to widen between grades 8 and 12.

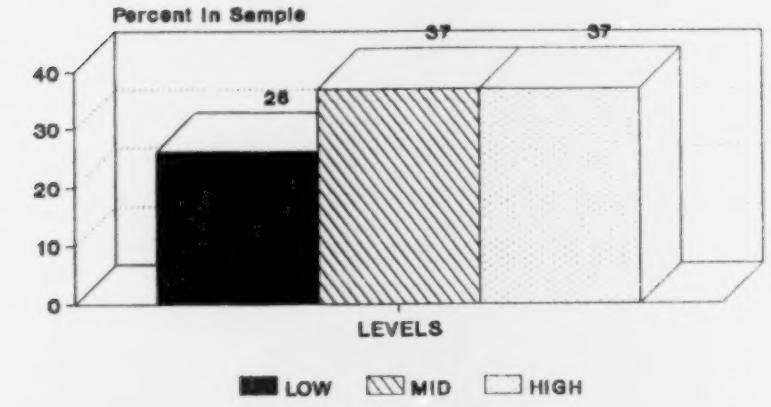
TRACKS IN SAMPLE
At Grade 9



N=408

C-3

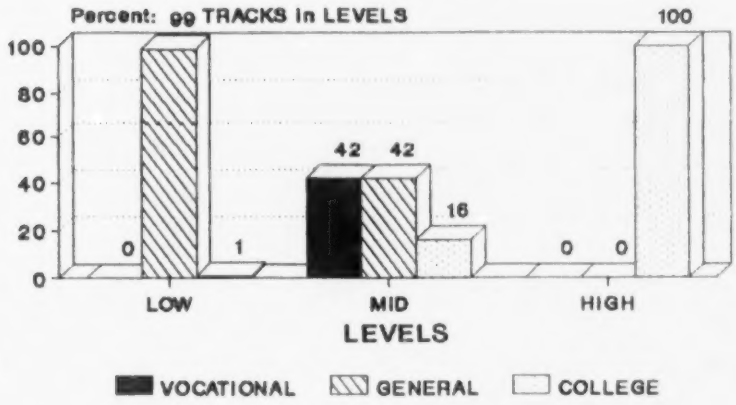
MATH LEVELS IN SAMPLE
At Grade 9



N=421

C-4

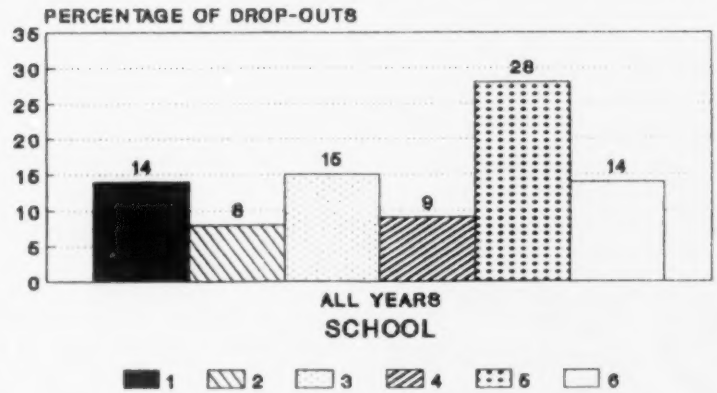
TRACKS and MATH LEVELS
At Grade 9



N-414

C-5

DROP-OUT RATES
BY SCHOOL



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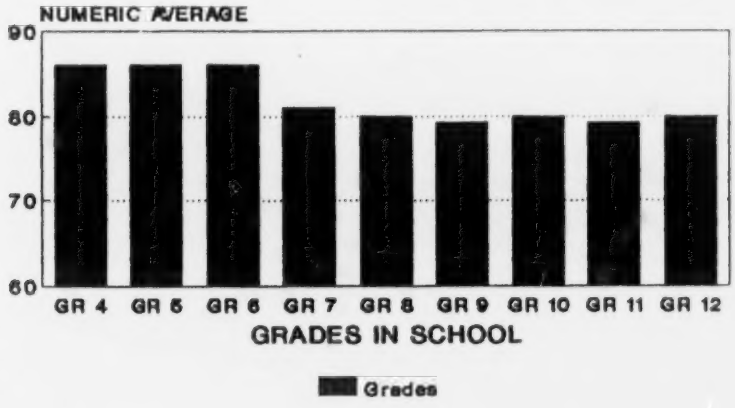
C-6

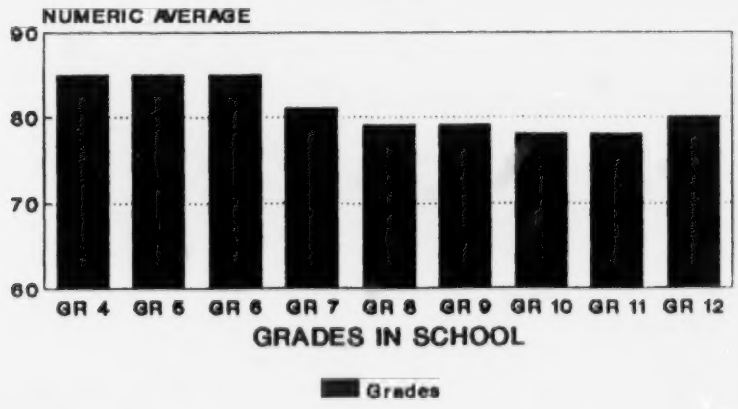
READING/ENG Grade Average
All SCHOOLS



N=369

C-7

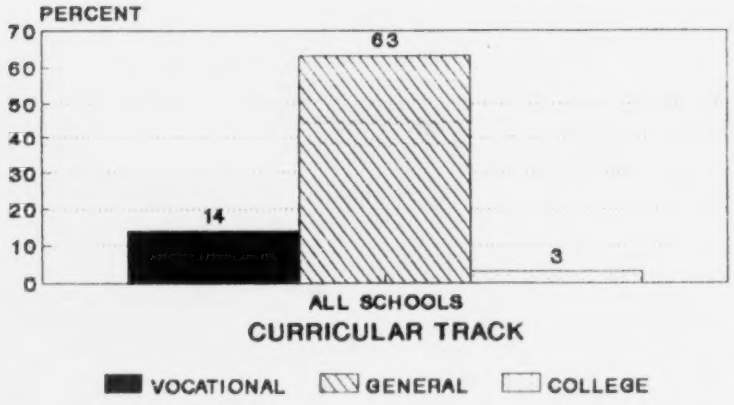
MATHEMATICS Grade Average
All SCHOOLS



N=369

C-8

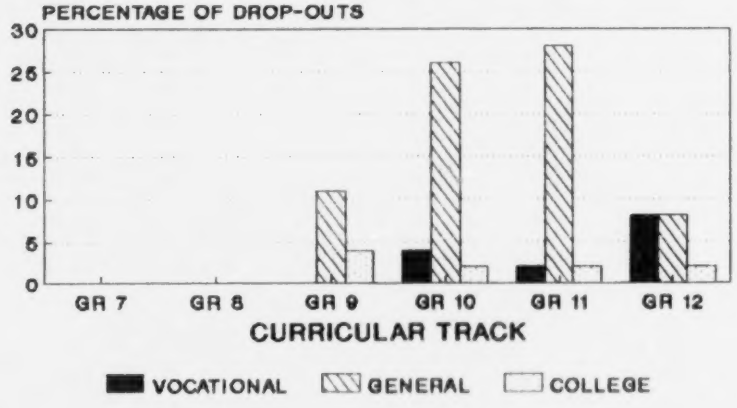
DROP-OUT RATES
BY TRACK - ALL YEARS



N-62

C-9

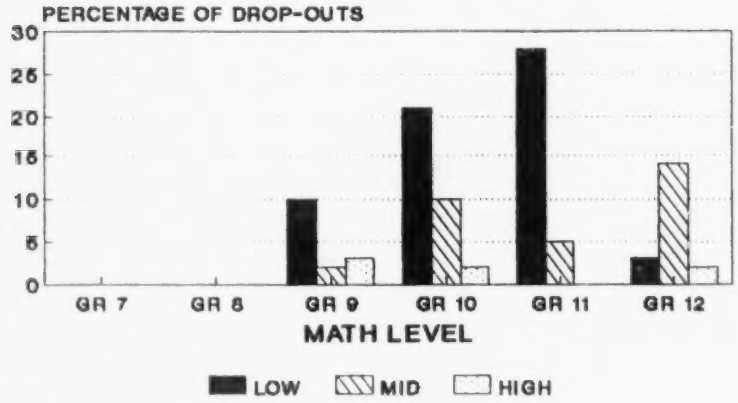
PROPORTION OF DROP-OUTS
BY TRACK AND YEAR



N-62

C-10

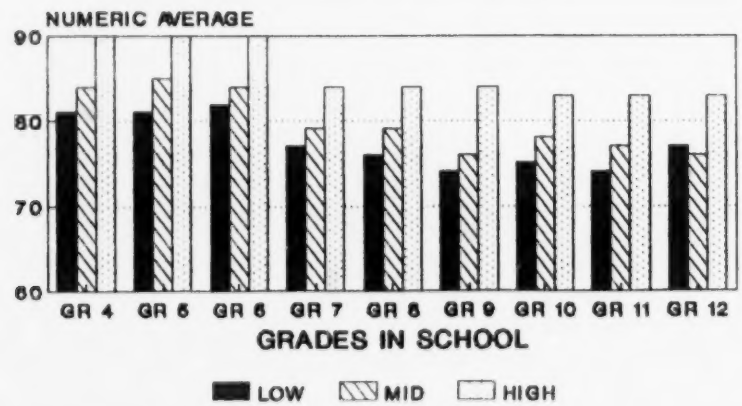
PROPORTION OF DROP-OUTS
BY LEVEL AND YEAR



N-58

C-11

READING/ENG Grade Average
All SCHOOLS by MATH LEVEL



N-368 at Grade 9

C-12

Given that many of the low level students are gone by grade 12, the gap between levels is actually much greater than it appears. If average grades for drop-outs are counted as failures then differentials between and among levels would increase since a greater proportion of low level students dropped out.

Prediction.

Given the relationships noted above, a series of discriminant models were developed to explore the extent to which dropping out, particularly within the general track, might be predicted from prior performance in school. Two research questions emerged here:

1. Can dropping out be predicted better than chance?

2. What variables maximized the prediction model?

Results of the first discriminant model, for the General Track, indicate that when all academic predictor variables from grades 4 through 9 are combined, an 88 percent prediction ratio of actual to predicted drop-out can be achieved for students in the general track at grade 9. Table 1, below indicates the F values and significance levels for each predictor variable. Table 2, indicates the discriminant functions and ratio of prediction to actual standing.

Table 1
Discriminant analysis: Grades in selected subjects for General Track (N=96)

Variable	F	Probability of F
READ4	2.55	*
READ5	9.43	.002
READ6	1.21	*
READ7	1.29	*
READ8	13.32	.000
MATH4	8.71	.004
MATH5	19.88	.000
MATH6	4.56	.03
MATH7	5.64	.01
MATH8	6.41	.01
SCI4	13.22	.000
SCI5	8.74	.003
SCI6	17.05	.000
SCI7	12.42	.000
SCI8	.44	*
SCI9	.11	*
MATH9	31.55	.000
ENG9	27.15	.000

* = Not significant, df=1,94. Wilks's Lambda value=.4733. Approximate F=9.45. Significance of F <.0001.

Table 2
Predictive Classification results for General Track Students who Persisted or Dropped-Out of School (N=96)

Fisher's Linear Discriminant Function		
Variable	Dropped-Out	Persisted
READ4	.1902	.6884
READ5	.4903	.6090
READ6	.8122	.6155
MATH5	.9756	1.0835
MATH6	.5933	.7058
SCI4	.2316	.3707
SCI7	.1345	.2002
SCI9	.1140	-.3288
MATH9	.4256	.5870
ENG9	.9776	1.1802
(CONSTANT)	-188.5304	-221.5537

Classification Results:

	PREDICTED GROUP	
ACTUAL GROUP	DROPPED-OUT	PERSISTED
DROPPED-OUT	88.5% (23)	11.5% (3)
PERSISTED	11.5% (9)	88.5% (69)

Percent of "Grouped" Cases Correctly Classified: 88.46%

Subsequent analysis of both vocational and college bound track groups yielded seventy-eight and ninety-five percent prediction ratios, respectively. In the case of vocational students, only grades in mathematics at grade 9 were significant predictors. In the case of college bound students, grades in reading at grades 7 and 8, as well as in science at grades 5 through 8 and English at grade 9 added significantly to the prediction model.

DISCUSSION

The results of this study are discussed in the context of limitations imposed by the data. The fact that two schools were unable to identify drop-outs may bias the results in the sense that failure to keep track of students who leave the system may be related to other instructional practices. That is, schools that are less effective in monitoring progress may also produce less desireable outcomes. To the extent that the above is true, state-wide drop-out rates and failures may be underestimated by the data. The fact that post-school plans were not kept at three of the schools may likewise result in underestimates of negative outcomes.

Other limitations imposed by the data may be less serious. The fact that two schools could not provide administrator identification of track until grade 11 was offset in the study by identifying students patterns of course enrollment as suggested by previous research. While performance measures were missing in some schools for the early grades, there were no patterns of association present in the missing data related to levelling or tracking. Missing data seemed to be normally distributed among schools. The transformation of letter grades to numeric equivalents, while probably resulting in some error for individual students, appeared to result in normal distributions of grades. Finally, given that the purpose of the study was to investigate "between track and level differences," the stratification of the sample seems reasonable. The result, however, leaves open the question of incidence among the State's schools.

Given the limitations above, what has been learned about the relationships of tracking and levelling to the experience of high school students in selected Vermont high schools? Discussion of the study's results is divided into the following topics:

* Dropping out of high school,

* The relationship of levelling and tracking to each other,

Dropping Out

The average drop-out rate for the study schools was 14.7 percent. This was expected in view of the State reported average of about 17 percent for cohorts in Vermont high schools. It was some what surprising (since ranges are seldom reported) that the study school averages ranged from a low of eight to a high of 28 percent. This means that some of the State's schools are probably losing nearly one-third of a given class of high school ninth graders over a four year period. The finding is less serious in view of U.S. Department of Education statewide average figures (in Weis, et. al., 1989) of 45 percent in Louisiana and 38 percent in Mississippi. But, the high end of the Vermont range is cause for concern. Added to these findings are the figures for the drop-out event by level and track. Here, the results are shocking. If the average drop-out rate for general and low level groups is as high as sixty percent, while others average 3 or 4 percent, this means that for some schools nearly all of the drop-outs are low level or general tracked students.

Levelling and Tracking

Given the results of previous studies which observed close parallel assignment of college track to high levels of study in mathematics, the results of this study which placed 100 percent of the college bound students in the high mathematics level was expected. The fact that the lowest mathematics level at grade nine was confined to general track students was somewhat unexpected. At higher grade levels more differentiation would seem more likely (a question, as yet, unanswered). Perhaps the more salient question is, when does the tracking and levelling begin in a students experience?

The relative success in prediction of dropping-out from historical student performance data suggests that for general track students the patterns of performance that lead to failure are already set by grade 4, perhaps even earlier. The fact that prediction is also possible but more difficult for vocational students is likewise interesting, but may be due to sample size, or difficulties with the analytical techniques. (Klecka, 1980; Lachenbruch, 1975)

Summary

The generalized picture of levelling and tracking in selected Vermont high schools is one characterized by limited opportunity for academic success for an entire segment of the school population. Low level, general tracked students have less time in school, tend to drop-out earlier and in greater numbers, are "typed" as low level students at an early age, are more isolated from the life of the school and are apparently less hopeful about the future than their peers. The picture is both dismal and consistent with the Social Darwin(istic) view of the school as an instrument of society. The picture is not of high schools alone, but of elementary, middle and possibly primary schools. It presents educators as well as policy makers with dilemmas involving change of both economic as well as educational structures.

Perhaps Michael Apple (with some assistance from Marcus Raskin) posed the relevant question:

> What should guide us in dealing with these dilemmas is the political principle of the common good, not simply profit. This principle asserts that "no inhuman act should be used as a short cut to a better day" and that any program in education, in politics, in health and welfare, in the economy, or elsewhere must be evaluated "against the likelihood that it will result in linking equity, sharing, personal dignity, security, freedom and caring." (Raskin, 1986) Current economic and social policies fall well short of this. The result is untold misery for millions of people and a future that is more than a little bleak for many of the youth of this nation. Perhaps we could begin by asking ourselves a question that has a long history in the tradition of democratic movements in the United States. Whose side are you on?

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